

What is claimed is:

1. A method of identifying a polypeptide, which method comprises the steps of
(a) derivatizing, in an aqueous solution, the N-terminus of the polypeptide, or
5 the N-termini of one or more peptides of the polypeptide, with at least one
acidic reagent containing a sulfonyl moiety coupled to an ester moiety to
provide one or more peptide derivatives, which reagent exhibits a half-life in
aqueous solution of not less than 10 minutes at room temperature, to prepare
one or more derivatives;
10 (b) analyzing at least one said derivative using a mass spectrometric technique to
provide a fragmentation pattern; and
(c) interpreting the fragmentation pattern obtained to identify the polypeptide.
2. The method according to claim 1, wherein the acidic reagent has a pKa of less
15 than about 2 when coupled to the polypeptide.
3. The method according to claim 1, wherein the mass spectrometric technique used
in step (b) is matrix-assisted laser desorption ionization (MALDI) mass
spectrometry.
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4. The method according to claim 1, wherein the mass spectrometric technique used
in step (b) is electrospray ionization (ESI).
5. The method according to claim 1, wherein in step (c), the fragmentation pattern is
25 interpreted using a software program or database.
6. The method according to claim 1, wherein all the steps are conducted as part of
an automated or semi-automated procedure.

7. The method according to claim 1, wherein the activated acid moiety is an N-hydroxysuccinimide (NHS) ester.
8. The method according to claim 7, wherein the reagent comprises a 3-sulfopropionic acid N-hydroxysuccinimide ester.
9. The method according to claim 7, wherein the reagent comprises a 2-sulfobenzoic acid N-hydroxysuccinimide ester.
10. The method according to claim 1, wherein the polypeptide has been obtained by enzymatic digestion.
11. The method according to claim 10, wherein the enzyme is trypsin.
12. The method according to claim 1, which further comprises a step of protecting lysine residues prior to the derivatizing step.
13. A reagent comprising a sulfonyl moiety coupled to an ester moiety for use in the method of claim 1.
14. A reagent suitable for use in peptide derivatization in an aqueous solution, selected from the group consisting of 3-sulfopropionic acid N-hydroxysuccinimide ester and 2-sulfobenzoic acid N-hydroxysuccinimide ester.
15. A kit for identifying a polypeptide by a mass spectrometric technique, which kit comprises at least one acidic reagent comprising a sulfonyl moiety coupled to an activated acid moiety in a container, which reagent exhibits a half-life in aqueous solution of not less than 10 minutes, preferably not less than about 20 minutes and most preferably not less than about 30 minutes at RT.

16. The kit according to claim 15, wherein the reagent has a pKa of less than about 2 when coupled to the polypeptide.
17. The kit according to claim 15, wherein the mass spectrometric technique is matrix-assisted laser desorption ionization (MALDI) mass spectrometry.
18. The kit according to claim 15, wherein the mass spectrometric technique is electrospray ionization (ESI).
19. The kit according to claim 15, wherein the activated acid moiety is an N-hydroxysuccinimide (NHS) ester.
20. A kit according to claim 19, wherein the NHS ester is selected from the group consisting of 3-sulfopropionic acid N-hydroxysuccinimide ester and 2-sulfobenzoic acid N-hydroxysuccinimide ester.